TCU

SYLLABUS: INTRODUCTION TO DATA SCIENCE
COSC/MATH 30103

COURSE & INSTRUCTOR INFORMATION

Course

Course Info: Introduction to Data Science, COSC/MATH 30103

Semester and Year: Spring

Number of Credits: 3

Course Component Type: LEC

Final Exam: 14:00-16:30 May 5, 2026	
Midterm Exam(s): TBA	
Last Day to Drop: April 1, 2026	
Last Day to Select P/NC: April 20, 2026	
See TCU Calendar for detailed information: https://registrar.tcu.edu/fall-academic-dates.php	

Note for students: The syllabus is your first course reading. It provides an orientation to, overview of the flow, and expectations of the course. You should turn to the syllabus for details on assignments and course policies.

Student Resources & Policy Information

Click or scan QR code for resources to support you as a TCU student. Please note section on Student Access and Accommodation, Academic Conduct & Course Materials Policies, and Emergency Response & TCU Alert.

COURSE DESCRIPTION

Catalog Description

Essential elements of the data science lifecycle from theory to practice. Introduces fundamental skills to prepare for advanced study in data science. Methodologies and several open-source tools used in solving data science problems are studied.

Prerequisites & Concurrent Enrollment

COSC 20803 and MATH 20123 with a C- or better in both.

COURSE MATERIALS

Required Materials

- Main Book: Fundamentals of Machine Learning for Predictive Data Analytics. Algorithms, Worked Examples, and Case Studies by Kelleher et al. (ISBN: 978-0262044691)
- Additional Readings: Feature Engineering and Selection: A Practical Approach for Predictive Models by Kuhn and Johnson (ISBN: 978-1138079229)
- Additional Readings: Storytelling with Data: A Data Visualization Guide for Business Professionals by Knaflic (ISBN: 978-1119002253)
- The Python Tutorial, https://docs.python.org/3/tutorial/
- NumPy QuickStart, https://numpy.org/doc/stable/user/quickstart.html

Supplementary Resources

Lecture notes/slides will be made available on TCU Online.

LEARNING OUTCOMES

Course Learning Outcomes

This course provides a hands-on introduction to fundamental knowledge of data science approaches and algorithms. Upon successful completion, the students will be able to:

(1) Understand different data preprocessing strategies, and know how to handle different data types and distributions,

(2) Be able to visualize and explain the data trends and insights that were generated through data processing and the basic supervised learning methodologies,

(3) Choose machine learning models based on a given data science task,

(4) Employ the chosen machine learning methodologies on real-life data, and perform comparative evaluations of these approaches while learning from these data.

COURSE REQUIREMENTS

Assignments

Homework

Homework will be based on lecture material and is designed to help you deepen your understanding of the course content. There will be a total of three homework assignments, accounting for 20% of the final grade. Students must have access to a laptop or desktop computer to complete all course assignments. Handwritten assignments will not be accepted.

Quizzes and Class Participation

Students are strongly encouraged and expected to attend all lectures. All quizzes will be taken in class without exception. There will be a total of six graded quizzes, which will be pre-announced. Quizzes will constitute 30% of the final grade.

Exams

There will be two exams: A Mid-term exam (20% of the final grade) and a Final exam (30% of the final grade). Both exams will be held in class, without exception.

Grading Philosophy & Policy

Late Work

Late homework assignments will be accepted up to 48 hours past the due date mentioned in TCU online. Late assignments will be penalized at 10% deduction per 12 hours. After 48 hours, you will get zero. Exceptions will only be given in extreme cases solely at instructor's discretion.

Participation, Engagement & Attendance

All students are strongly encouraged and expected to attend all lectures. While attendance may not be recorded daily, this course includes frequent in-class quizzes, and all exams will be conducted in class without exception.

Make-up Examination Policy

Make-up exams will not be provided by default, except in extreme circumstances. Exceptions may be made in cases of serious personal tragedy, severe illness, or similar situations, but such leniency is at the instructor's discretion. If unforeseen circumstances prevent you from attending class, please notify me so we can work together to ensure your success in learning the material.

Course Assignments & Final Grade

Each grading item listed below will have opportunity for extra-credit of up to 5-10%.

Grade Item	Percentage
Homework: HW1(4%), HW2 (8%), HW3 (8%)	20%+
Quizzes: 5-6 Quizzes (5% to 6% each)	30%+
Midterm Exam	20%+
Final Exam	30%+
Total	**100%+**

Grading Scale(s)

In the grading scale below, **" ["** means that the number is included in the range, and **") "** means that the number is excluded.

Note: Each grading item will include bonus exercises as shown above indicated by **"+"**, which allow students to earn extra credit. Apart from that, no additional extra credit or work will be offered under any circumstances. The final course grades will **NOT** be curved, with no exceptions.

Grade	Score
A	[94,100]
A-	[90, 94)
B+	[87, 90)
B	[84, 87)
B-	[80, 84)
C+	[77, 80)
C	[74, 77)
C-	[70, 74)
D+	[67, 70)
D	[64, 67)
D-	[60, 64)
F	[0, 60)

Course Policies

Academic Honesty

I take academic honesty very seriously. Academic honesty is a core value of the university and all members of the university community are responsible for abiding by the tenets of the policy. You can find TCU's student's code of conduct (see section 3.4) in student handbook for academic misconduct. Lack of knowledge of this policy is not an acceptable defense to any charge of academic misconduct. Examples of academic misconduct and course policy violation include but are not limited to plagiarism, cheating on examinations, unauthorized collaboration, falsification, multiple submissions and unauthorized public posting and distribution of instructor-prepared course material. If the occurrence of academic misconduct or course policy violation is proven, the student or students will receive an immediate and final grade of F. Disciplinary penalties will also be sought in addition to academic penalties. Names of the persons involved will be reported to the Dean of Students. This includes all parties involved, who will be treated equally, and I will not attempt to determine who actually developed the solution and who copied. For further clarification of university policies regarding academic honesty, please read Academic Conduct & Course Materials Policies.

Technology Policy

Artificial Intelligence (AI) Ethical Considerations and Consequences for Misuse

Using AI-generated content inappropriately or without authorization may be considered academic misconduct and/or a breach of professional ethics specific to the discipline. Misuse of AI or similar assignment-help tools will be addressed in accordance with TCU's Academic Conduct Policy or other relevant policies, and could lead to penalties such as failing the course, dismissal from the program, suspension, or expulsion.

COURSE SCHEDULE

This calendar represents current course plans. Plans may need to change to enhance the learning opportunities and will be communicated via in-class announcements or TCU Online.

Week	Dates	Topics	Notes
Week 1	Jan 13, 15	Fundamentals of Data Science + Python Tutorial	Read Syllabus
Week 2	Jan 20, 22	Machine Learning for Predictive Data Analytics	
Week 3	Jan 27, 29	Data to Insights to Decisions	HW1 Posted
Week 4	Feb 03, 05	Data Exploration	Quiz 1
Week 5	Feb 10, 12	Data Preprocessing	
Week 6	Feb 17, 19	Data Presentation	Quiz 2
Week 7	Feb 24, 26	Information-based Learning	
Week 8	Mar 03, 05	Model Evaluation I	Quiz 3
Week 9	Mar 10, 12	Midterm Review/ Midterm Exam	HW 2 Posted
Week 10	Mar 17, 19	SPRING BREAK!	
Week 11	Mar 24, 26	Similarity-based Learning	

Week 12	Mar 31, Apr 02	Probability-based Learning	Quiz 4
Week 13	Apr 07, 09	Error-based Learning	HW 3 Posted
Week 14	Apr 14, 16	Feature Selection	Quiz 5
Week 15	Apr 21, 23	Feature Selection/Model Evaluation II	Quiz 6
Week 16	Apr 28	Final Exam Review	
Week 17	May 05	**Final Exam**	